The Michigan Antique Radio Chronicle

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A QUARTERLY WRITTEN FORUM OF THE MICHIGAN ANTIQUE RADIO CLUB

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The Winter Vintage Electronics Expo

Saturday, February 1, 2020

THE place to find vintage radio and audio gear

See inside back cover for details

New Venue for EXTRAVAGANZA '20!

See page 3 for the story.

THE MICHIGAN ANTIQUE RADIO CLUB

The Michigan Antique Radio Club was founded October 19, 1985 at the Dillon Inn in Lansing, Michigan. Present at this historical meeting to found MARC were Jim and Brenda Clark, Larry Anderson, Karl Rommel, Mike Male, Dick Perry and John Kent. The purpose of the organization is to preserve the history and enhance the knowledge of radio, television, and related disciplines, with special emphasis on contributions originating in the state of Michigan. Dues for membership in M.A.R.C. are $25.00 annually (US funds) and payable in January. Officers of M.A.R.C. welcome your membership, your questions and your personal contributions to enhance the service value, growth and activities of the organization. Terms of office for Board members expire concurrently with the summer EXTRAVAGANZA meet held in Kalamazoo, Michigan. Send Correspondence to MARC, 311 Wordsworth St., Ferndale, MI 48220. E-mail: president@michiganantiqueradio.org. **Visit our Web site at** www.michiganantiqueradio.org.

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The Michigan Antique Radio Club is willing to assist in the sale of estate collections of antique radios and other collectable electronic items. For information, please contact either Mark Oppat at 734-207-2346 or Jeff Lilly at 248-602-7513.

Perspectives

Hello everyone. The exciting news that I mentioned last time has become official!

First, though, let me remind you all that the winter edition of the Vintage Electronics Expo is scheduled for Saturday, February 1, 2020 at the Costick Center in Farmington Hills. We will have the usual array of activities, including our excellent dealer's rooms, two silent auctions, bargain auction, presentation, 50-50 drawing, contest, and much more! As before, food service will be provided by the Ferndale Middle School Robotics Club. In addition, we will be experimenting with "load-in valet" services at this show- for a $10 minimum donation to the Robotics Club, you can have the services of a young, strong back and pair of arms to assist you in unloading for a reasonable length of time. Please visit our website at www.thevee.org to keep on top of the latest developments. Tables and registrations go on sale soon, so check back often for updates!

The really big news, however, is that the summer show is moving. Extravaganza 2020 will be held July 18-19 at its new location at Burton Manor in Livonia, Michigan.

We debated about the move from Kalamazoo for a long time. The facility there was nearly perfect for our needs, and in a great price range. But the fact is, after many years of trying various combinations of advertising, we were forced to conclude that while the heart of any show are the regulars who come rain or shine, the body is made up of the locals. Kalamazoo, for whatever reason, couldn't provide us with enough interested people to get the attendance to where we wanted it, what our dealers deserved. Over the past several years, we've watched attendance at the Winter Vee increase from 500 to 800 to over 1100 at last year's show, while Extravaganza's attendance paled in comparison and has been stagnant. We needed to do something different.

We believe that moving the show to a major metro area, namely the Detroit suburbs, not too far from where the Winter VEE is enjoying such success, will boost attendance. Kalamazoo was just a bit too far from Detroit and a bit too far from Chicago to draw crowds from either city. In addition, most of our board members and officers reside on the eastern side of the state and have the advantage of familiarity with the local scenes and advertising options.

Burton Manor has already proven to be a willing and excellent partner for our ambitions. Under new management, Burton Manor is an elegant location that specializes in weddings but has shown interest in hosting trade shows and meets like ours as well. Over the summer, the board and trustees, largely led by the unflagging efforts of Mark Oppat, struck a deal with Burton Manor's management that they could like and we could afford.

Burton Manor is conveniently located just off of the Inkster Road exit on I-96. Unlike the Kalamazoo Expo Center, there are two hotels within easy distance (one walkable) and many more within a mile or so. As with Kalamazoo, the event can be held fully indoors in air-conditioned comfort. The halls are spacious, well-lit and have electrical outlets available. Load-in will admittedly be a little tougher, but we are working with Burton Manor on solutions. Parking is more than ample. Restrooms are plentiful.

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NOTES FROM THE SERVICE SHOP

No. 108

by John Reinicke

Magnetic Amplifiers and Circuit Boards

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My trip to Centerburg had been more eventful than I expected. The late fall snowfall had made for a more adventurous trip than I would have liked. When I made the arrangements with Ken and Betty I had figured on a nice, crisp, late fall day but instead of late fall color I took in a landscape covered in white. The snow had made for a slow trip and I arrived well after dark. I used my key to open the back door and entered the key code in the security system before making my way upstairs to camp for the night.

Because of my late arrival, I was really appreciating Betty's coffee as I visited with Ken and Betty before they opened their shop for the day. We exchanged the usual family gossip and tales of grandchildren. As we finished the carryout breakfast, I got around to asking about business.

"So, the last time I was here you showed me a very old chess set, and I wondered how the auction had gone."

They both chuckled and it was Ken who answered. "Well, I would have to say, it went very well indeed and darned if it didn't lead to another story."

I smiled, cocked my head and responded with a very long "And..."

Ken continued, "Remember that we couldn't be certain about how the provenance would be accepted since we only had expert opinions and tests, not a true archeological trail." I nodded in agreement as he continued. "Well, it would appear that we shouldn't have been concerned. It is a good thing we have a great tax accountant because when the gavel fell the set went to a well healed collector in Eastern Europe for $35 million. And the best part is that he plans to loan them for display at a museum."

To say I was astonished would be an understatement and the expression on my face must have been priceless. "You did say MILLION?!"

"That I did. And that leads us to the next tale."

"This is already a really good story; I can't wait to hear what could top that."

Ken was only too happy to explain. Since we were in New York for the auction we decided to take an extra couple of days to celebrate. Taking in a play is nice, but we also like to prowl around other antique shops and New York has some doozies. We like to study how others display and market their offerings and sometimes we get great ideas and sometimes we walk out laughing to

ourselves. No matter what, it is entertaining. Anyway, we found this really interesting old shop in Queens. While I was looking over the stuff on the ground floor, marveling at the asking prices, Betty was on the fourth floor looking over a long-forgotten corner that was filled with boxes of all sorts of items that were clearly from all sorts of estate sales."

Betty chimed in. "I like it when I find places like this because I can usually make a deal on box lots. We very seldom ante up for the stuff in the front room, but we have found some real gems in old, dusty boxes. I found a rather sizable stash of boxes of old pictures. Some of them were in frames. Some of them were old prints and photographs of places long forgotten. Some were oil paintings on a variety of media. Since we were feeling flush, I was able to pick up the entire lot for a grand. The shop owner seemed to be happy to clear out that corner and I was hoping that after we paid shipping the pile would be worthwhile.

"When we got it back to the warehouse, I laid it all out to decide what would go online, what would go in the annex and what would be displayed here in the shop. What I did not expect was another auction find."

My curiosity had been more that piqued. "So, what might that be?"

With that, Ken stood up and handed me a pair of white gloves.

"Really – Again!" I responded.

"Yep, really!" With that Ken opened the office safe and extracted what was clearly an old painting. It was about the size of a sheet of typing paper painted on wood with a wooden surround. He handed it gingerly to me for a closer look.

I also handled it very carefully. "It appears to be some sort of religious scene. It looks like there are holes on one side for hinges or something like that." I looked it over and handed it back to Ken who propped it up on his desk for us to enjoy. "The only thing I can say is that it appears to be really old. I suspect you have something more to say about it."

Betty filled me in with the rest of the story. "After considerable checking we can say with considerable certainty that the painting is of 'Veronica wiping the face of Jesus' and it was painted by the Italian master Cimabue around 1280. Cimabue is also known as Cenni di Pepo. It is a part of what is called a diptych which means it was hinged to another painting so it could be folded to protect the paintings. It is part of a set of 8 which depicted the 'The Passion of the Christ'. Only three other sections of the original have been found. One is displayed at the Frick Collection in New York. A second is in the National Gallery in London. The third one turned up just this past year in a French farm kitchen. It had been hanging above a hotplate for years and the farm woman knew it was old and had invited an art expert to check it out. We used the same infrared scan he did to confirm the authenticity of the work.

"The French find, "Christ Mocked" was put up for auction on October 27th of this year at the Acteon Auction house in Senlis, France. The pre-auction estimate was 4.4 to 6.6 million dollars U.S." Betty paused dramatically.

I couldn't resist. "And it sold for?"

Betty and Ken were both grinning and Ken responded. "It sold for a very cool $26.6 million!"

I must say that I was silent for a long time. "Wow" followed by another pause. "Well, that does bring up a couple of questions." Betty and Ken were both grinning and Betty waved for me to continue. "The first question is: If I may ask, do y'all plan to retire some tropical island? And the second question would be: How do you suppose

that painting found its way to New York?"

Ken laughed out loud. "No. Emphatically we do not plan to retire any time soon! We are just having too much fun. And, before you ask, we have no intention of opening a shop in some fancy Fifth Avenue storefront. We really do like living and working in Centerburg. As for how the painting got to be on this side of the Atlantic, I suspect its transit came at the end of World War Two. A lot of GI's brought home war souvenirs and I can envision it being retrieved from a bombed-out farmhouse or even a fancy manor house that might have been used as a field headquarters. It really is a rather simple work and except for Betty I think few people would even begin to suspect its age or value."

We spent a few more minutes discussing the painting and the round of testing they used to confirm its age and provenance. Ken did mention to me to not to discuss seeing the painting – at least until it was sold. They figured the fewer people knew of it, the safer it would be.

I was still shaking my head as I walked to the front of the attic to sit at the old roll top desk and read from the logbook and diary of Clemens Mettmann who ran the Centerburg Radio and TV Shop that had occupied the building in the middle of the 20th century. With the chill, I was only too happy to have a hot cup of coffee as I stepped back in time.

It was early on cold, dreary, Saturday morning. Darcy was sitting at her desk in the front room preparing invoices and taking care of bookkeeping. Clem was at work at his bench. Gerry was reviewing his calls for the morning which would start with a maintenance check at the Sheriff and Police transmitter site. A bit of a commotion at the back door had Clem and Gerry watching, with a grin, as Art struggled to bring a rather large and very old radio chassis through the shop to his bench. With some effort, he set the chassis on his bench and silently went back outside. Clem and Gerry looked at each other and Gerry shrugged his shoulders. The back door opened again, and Art was carrying a pair of big speakers and headed for his bench. He deposited the speakers carefully on the floor under the bench.

With the speakers out of the way, Art walked over to hang up his coat and fetch a cup of coffee. Coffee in hand, Art opened with a cheery "Good Morning!"

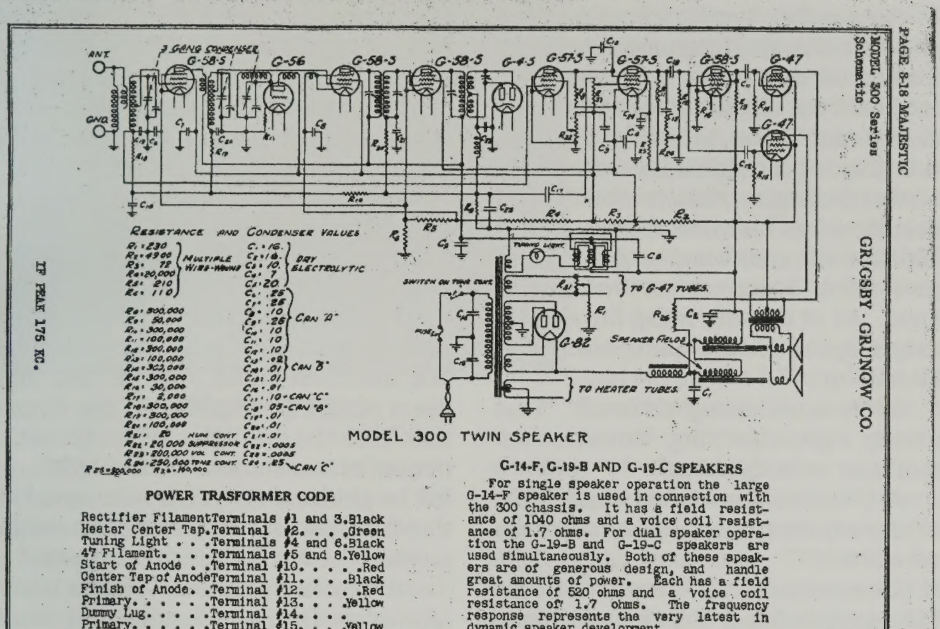
Clem looked over at Art's bench. "Well, Mister Miller, it appears you have brought us another one of your relatives prize radios. You DO know that Hoover was president when that thing was designed. Are you sure it is worth the effort?"

Art grinned. "Well, first, it is not a relative's radio. It happens to belong to a neighbor and they rather like it because it is in a really big, elaborate, cabinet."

Clem had recognized the set. "If it is what I think it is, I have seen that set before. If memory serves, it is a Majestic model 300. I agree, the cabinet is quite imposing and, if your parlor is big enough, it does have something of a charm. With those two big speakers, it really does sound good and it was as good as you could buy in 1932. I hope you have not encountered the literally life threating booby trap in that set."

Art looked at the chassis and then at Clem. "Booby trap? I guess I haven't found it. I know that it is not working and has a bad hum, so I simply brought it here. Before I get started, what is the booby trap?"

The exchange had piqued Gerry's curiosity and he had walked over to look at the chassis. "OK, boss, other than being a really old set, what would



MODEL 300 TWIN SPEAKER

POWER TRASFORMER CODE

Rectifier Filament	Terminals #1 and 3. Black
Heater Center Tap.	Terminal #2. . . . .Green
Tuning Light . . .	Terminals #4 and 6. Black
47 Filament. . . .	Terminals #5 and 8. Yellow
Start of Anode . .	Terminal #10. . . . .Red
Center Tap of Anode	Terminal #11. . . .Black
Finish of Anode. .	Terminal #12. . . . .Red
Primary.	Terminal #13. . . .Yellow
Dummy Lug.	Terminal #14. . . .
Primary.	Terminal #15. . . .Yellow.

G-14-F, G-19-B AND G-19-C SPEAKERS

For single speaker operation the large G-14-F speaker is used in connection with the 300 chassis. It has a field resistance of 1040 ohms and a voice coil resistance of 1.7 ohms. For dual speaker operation the G-19-B and G-19-C speakers are used simultaneously. Both of these speakers are of generous design, and handle great amounts of power. Each has a field resistance of 520 ohms and a voice coil resistance of 1.7 ohms. The frequency response represents the very latest in dynamic speaker development.

make this set any more dangerous than others of the era?"

Clem walked over to Art's bench. "Let me see if I can explain. This set has a number of features that were really quite advanced for the day. The first thing you will notice is that those Majestic tubes are covered in with a conductive silver coating. Majestic used that coating rather than applying a separate Goat shield for the tubes. Of course, the Goat shield would be connected to tabs to ground it to the chassis. The Majestic shields are connected to the cathode pin of the tube. In just about all cases the cathode of a tube is either connected to chassis ground or at most is just a few Volts above chassis ground – no problem.

"However, in this set, they came up with what they called 'Automatic Synchro-Silent Tuning.' That is just a fancy term for a squelch circuit that would cut out the static and noise between stations. To achieve this, they used a G-57-S tube for the first audio amplifier. This pentode tube has a very sharp grid cut off characteristic. The cathode of this tube is connected to a tap on the B plus and this tap is also connected thru a resistor to the plate of another G-57-S which is used as a control tube. The plate of the control tube is connected to the suppressor grid of the first audio amplifier. The control grid of the control tube is connected to the AVC line and when there is no signal, the control tube will conduct and cause the suppressor grid of the audio tube to be biased well below cathode potential. This will cut off the audio tube and no sound will pass. When a signal is received as a station is tuned in, the AVC Voltage will swing negative and turn off the control tube which, in turn, will allow the suppressor grid of the audio tube to return to cathode potential and that will allow the audio signal to pass. It really is a fairly clever circuit and was certainly advanced for the day. However, because of the Majestic tubes, it presents a considerable risk for the radio mechanic.

"Remember I said the cathode of the first audio amplifier was connected to a tap on the B plus and remember that I said the shield on Majestic tubes is connected to the cathode of the tube. So, in this set, the shield is connected to a lethal Voltage. This is doubly bad because, we as radio mechanics, expect a shield to be connected to ground and don't think twice about touching a shield. All of this can make for a really nasty surprise for the unexpecting mechanic."

Gerry was shaking his head. "That is really a good warning. One wonders what they were thinking."

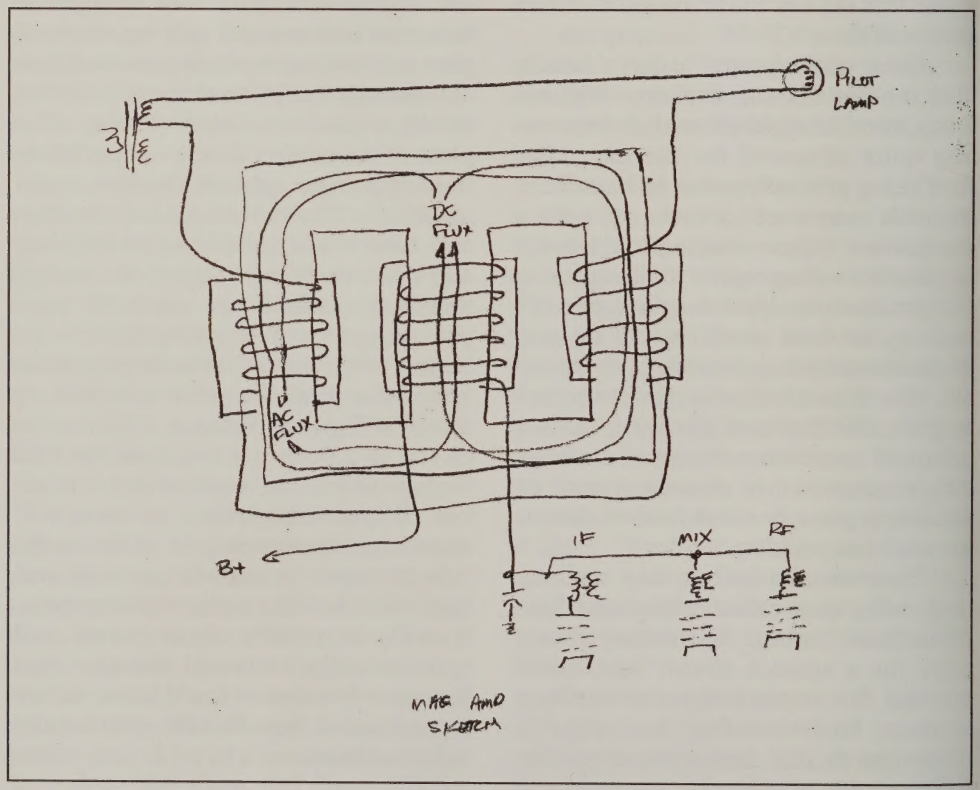
Art was looking at the chassis. "So, is there anything else I should be on the lookout for?"

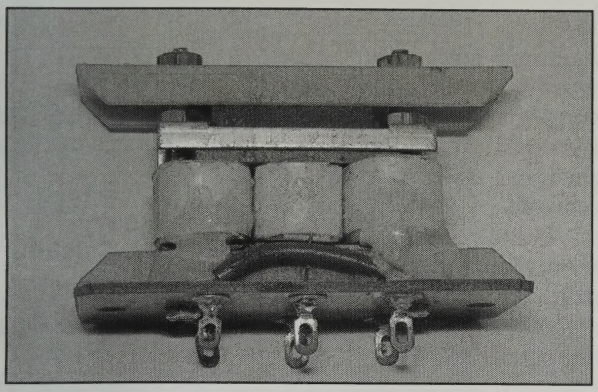
Clem responded. "That is the only really serious thing. For the most part, it is a fairly straight forward set with a couple of notable items. The first is that Majestic tubes are Majestic tubes and you might not find a suitable substitute. Fortunately, there is a good stock of them over in the barn. The other thing is the rather interesting tuning indication on that set."

Art took another look at the chassis. "Tuning indication? The set does not have an eye tube or a meter. Did I miss something?"

Clem smiled. "In a way you did, but only because the indication is clever and unconventional. In this set, they use a magnetic amplifier in the circuit that feeds the dial light. When the set is not tuned to a station, the dial light is at full brightness. As a station is tuned in, the dial light will dim, and peak tuning is when the dial light is the dimmest."

Art looked puzzled. "That is a sort of strange tuning indication. So, what is a magnetic amplifier and how does it work in this circuit?"





Magnetic Amplifier

Clem reached for a sheet of paper and a pencil and was sketching as he explained. "A magnetic amplifier takes advantage of the properties of an inductor and uses a comparatively small DC current to control a higher current AC device. For example, big magnetic amplifiers have been used to control theater lighting. Since it is only controlling the dial lamp, the one in this set is small. It works like this." Clem drew a sketch of a transformer core with three legs. "You start with a transformer core with three legs. There are two windings with larger wire around the two outer legs. These two windings are connected in series such that the magnetic flux circulates around the outside of the core. If the two windings are identical, very little magnetic flux will pass through the center leg. The number of turns of wire in the two windings and the core material will make for a large inductance that is connected in series with the load, which in this case, is the dial lamp. A large inductance makes for high series impedance which means the light would be very dim or not even visibly on.

"The center leg of the core has the control winding which is very many turns of fine wire. A DC current is applied to this winding and that causes magnetic flux to circulate from the center around through the two outer legs. This DC current will cause sufficient magnetic flux to make the core go into magnetic saturation. Because the core is in saturation the inductance will be greatly reduced and the resultant impedance will go down considerably. Thus, with low series impedance, the load will become energized – the lamp will get brighter.

"In this Majestic set, the plate current for the RF amplifier, the Converter and IF amplifier is passed through the control winding of the magnetic amplifier. When there is no signal, the AVC line is at minimum and the current though the tubes is at a maximum. This will saturate the core and the pilot lamp will be bright. As a station is tuned in, the AVC Voltage will become more negative and this will tend to bias those tubes off, thus reducing plate current. This will reduce the current in the control winding and take the core out of saturation. The inductance will go up and the dial lamp will dim.

"There is a filter capacitor on the plate side of the control winding to ensure that the small amount of AC current that appears in the control winding does not appear on the plates of the RF and IF tubes. Of course, if that capacitor were to open, there would be hum. Oh, one other thing. Check the Riders, but as I recall that set has a 175 Kilocycle IF frequency."

Art nodded in agreement and set about getting the set ready to test. Gerry returned to his bench to collect his things for the morning calls and Clem went back to his bench. As Gerry was leaving, he noticed that Clem was busy putting 4 screws into a mounting flange at the back of his bench. "What is that for, if I may ask?" He asked.

With that, Clem produced a lamp that was integrated into a magnifying

(Continued on page 10)

glass and inserted the pivot of the lamp into the flange. The lamp was mounted on a pair of pivoting arms with springs for counterbalance. Clem swung the lamp to demonstrate that it would reach a large portion of the bench and could be set at any height. The combination of springs and set screws would keep it in place. As he finished the demonstration Clem explained. "Before you ask -- This, as you can see, is a magnifying glass with a light. A little extra light can be very helpful from time to time. I expect the magnifying glass will come in handy as we work on these new printed circuits that are turning up everywhere. I have a transistor radio to work on and this will give me a chance to see how it works out. If it proves out, I will get one for your benches as well.

"As for the new printed circuits, I figure we had better get used to them. The manufacturers are going to figure how to make them better and before we know it, they will be everywhere so we will have to figure out new techniques to work with them. So far, I can see one advantage and that is the components are absolutely always in the same place from set to set. You can look at a picture in the Sams and, by golly, parts will be exactly where they are in the picture."

Gerry nodded in agreement and headed out the back door. Art was busy checking the Majestic and Clem was testing the transistor set he mentioned. Clem did find his new magnifying lamp to be helpful. After about a half hour, Art hear Clem exclaim, "Ah, there you are!"

Art looked up from the Majestic. "There who is?" he responded.

Clem looked up from the radio. "The 'who' is a crack in the circuit of this transistor radio. It has a crackling intermittent problem and is not working more than working. With this new lamp, the crack looks like the Grand Canyon."

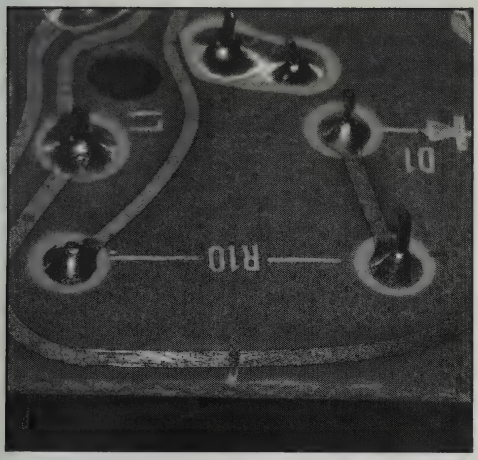
Art walked over to take a look as Clem explained. "As you can now see clearly, there is a crack in the circuit board material which I suspect is the result of the set being dropped. Those little transformers aren't all that heavy, but the weight when the set landed on the floor was enough to crack the board. The crack propagated thru the copper trace and opened it up."

"So how do you plan to fix it?" Art asked as he studied the board under the lamp. As he looked, he commented, "This lamp is really the bee's knees. Except for getting my breath on the lens it is a great way to see details. So how do you plan to fix the break?"

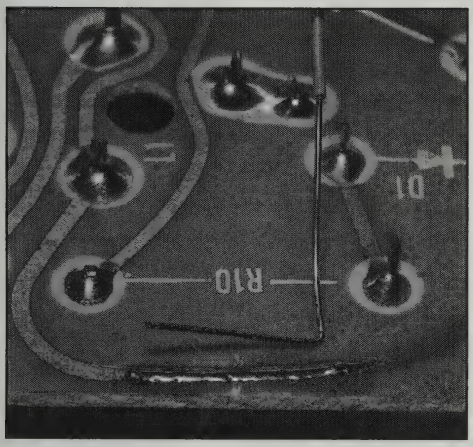
Clem paused for a moment to think. "The crack in the board itself isn't very long so I think I will start with a little bit of thin glue in the crack to help support the board. If the crack were longer, I might try gluing a support like a bit of wood or phenolic on the back to bridge the crack. As for the copper foil, I am planning the following steps. First, I will clean off the copper on either side of the crack. This set has what they call a solder mask which is supposed to limit the solder to just where it is needed. Since it is designed to block solder, I will have to clean it off to expose the solder. I will then tin the foil on both sides of the crack. I will take a bit of bare number 24 wire and bend it into an L and tin the wire. The long leg of the L can serve as the handle and the short leg will bridge the crack. I will then solder the wire of the short leg across the crack. Once the solder cools, I will simply cut off the longer leg and leave the wire across the break."

Art nodded in agreement but asked, "Couldn't you just bridge the crack with solder?"

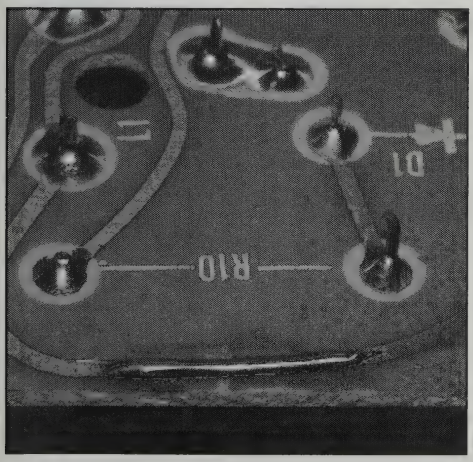
Clem smiled. "Yes, I think I could. But solder is not all that strong and I would expect that with thermal cycling



Solder mask removed



L-shaped wire used to create bridge



Repair completed

that crack would propagate thru the solder in just a few days or weeks. The wire will make for a much more durable repair. I had another set earlier this week where the foil trace had broken right at edge of the round donut that went around an IF transformer pin. For that, I made a loop in the wire to imitate the donut and then extend out onto the trace.

After the glue had a chance to set up, Clem went about his repair as Art watched. When he was done, Art commented, "That is a pretty slick trick. Do you plan to show it to Gerry?"

Clem laughed. "No, I won't show it to Gerry because he showed it to me!"

Art returned to his bench and Clem touched up the alignment on the now working transistor radio. After a few minutes, Art could see that Clem was finishing the trouble ticket for the transistor radio. "Mr. Mettmann, can I ask a question?"

Clem responded with a grin. "Of course you can. I just can't guarantee I can answer it."

Art smiled in return. "Last week, I repaired a tape recorder. The repair was just an open cathode resistor due to a shorted audio output tube. The question does not have to do with the repair. I just wondered why tape recorders have an oscillator. Couldn't you just use a magnet for erase?"

Clem had the look of a college professor as he replied. "The bias oscillator was invented just before the war by a couple of German engineers, W. Weber and H.J. von Braunm. What they discovered was the introduction of a low-level supersonic signal on the record head would greatly reduce noise and distortion. Further, the same signal could be used at a higher level for an absolutely silent erase. If you have experimented with tape recording, I would expect that you have discovered that using a permanent magnet to erase

tape makes for a very noisy erased tape."

Art grinned and nodded in agreement. "You are right, I had noticed that."

Clem continued. "The bias oscillator frequency varies by manufacturer and for the most part will be around 75 Kilocycles, plus or minus. The designers have to compromise because a lower frequency works better to get sufficient current to the erase head and a higher frequency can make for lower distortion on the record head. For the repair mechanic, there are a couple of things to keep in mind. On some sets, the bias oscillator will drift in frequency, so any adjustments should be made after a longish warm up. The record bias is actually somewhat critical. If the bias is too high the distortion will be lower but the high frequencies in the recording will be lost. If it is too low, the high frequencies will be there, but the distortion will be higher. To compound the problem, the exact correct record bias will depend on the formulation of the recording tape. The recommended method is to use the manufacturer's settings. Usually this is to connect around a 100 Ohm resistor in series with the record head and measure the Voltage across the resistor.

"As another note, it is my understanding, that when the tape is recorded, because the bias oscillator 'shakes up' the magnetic domains in the tape, the actual recording takes place at the trailing edge of the gap in the record head. This is why, on those fancy recorders with separate record and playback heads, the gap in the record head is visibly bigger than on the playback head. Of course, a very narrow gap in the playback head makes for good high frequency response.

"As you no doubt have noticed, there are a number of mechanical adjustments to ensure the tape is transported properly and aligned properly on the head. The mechanic would be well advised to follow the manufacturer's instructions when making these adjustments. That is why the Sams on tape recorders usually run to several pages."

Art had, indeed, noticed the size of tape recorder Sams and nodded in agreement. "Thanks, boss, for the education." Clem responded with a slight smile and a nod as Art returned to his bench.

The rest of the morning went smoothly. The hum in the Majestic was corrected by the replacement of filter capacitors. Art found that to be an aggravation because so many capacitors were located in a single, potted, can which required the installation of terminal blocks for individual replacements. Darcy finished her paperwork and was able to take care of several customers that had braved the dreary weather. Gerry's calls went without problems and he was back by lunchtime. After the transistor radio, Clem was able to resolve a problem with the agc circuit in a television set.

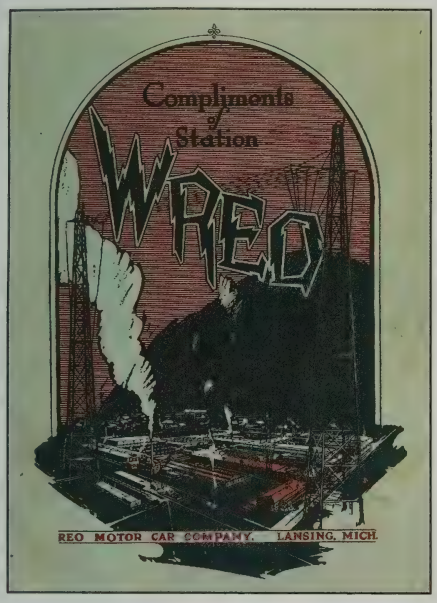
I sat back in my chair and decided it was time to refill my coffee cup. I made a mental note to try to remember to be VERY careful if I ever come across a Majestic 300.

Editor's Note: The auction prices cited at the beginning of the article may seem astronomical, but John assured me that they are based on actual reported sales of similar items in recent auctions.

The Voice of REO Heard Nationwide

By Craig Whitford

"This is WREO, the Reo Motor Car Company at Lansing, Michigan" and with that announcement WREO was on the air in the Reo Clubhouse and



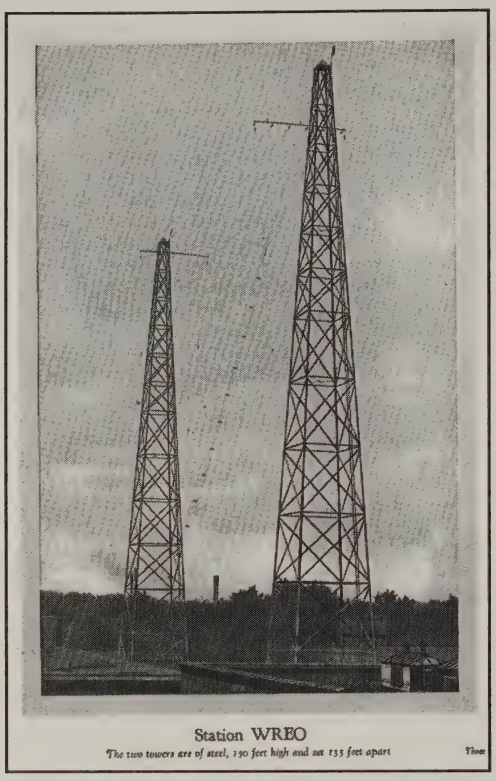
around the nation. Thousands of listeners in every state received the WREO signal through headphones and loud speakers. Radio in 1924 was sweeping the country. Plans for building your own crystal radio set were included in the *Reo Spirit*, distributed to Reoites, or they could purchase a commercially model for a few dollars.

Reoites first learned of the company station in the March 1924 issue of the *Reo Spirit* with the announcement, "It is the plan of the Reo to broadcast a program two or three times weekly when the new station is in operation. There is considerable talent within the Reo plant, and together with the Reo band and band glee club, a large part of the programs can be home talent of the exceptional order."

Test programs were broadcast from WREO to determine reception. Communications were received from thirty-three states which assured the men in charge that they were "coming in fine." It appeared that Lansing was a strategic geographical location for broadcasting as even less powerful receiving sets any place in the United States could be able to tune in on the programs.

Although Lansing was the capital of Michigan and the home to a number of large industrials, it never had a radio station. It was largely the thought of keeping in step with other communities that the Reo Motor Car Company installed their outfit.

In November, WREO was on the air with the voice of Roy Davis, a Reo bookkeeper, as announcer and manager of programs. Davis also played the pipe organ in the clubhouse from 7:30 to 8:15 each morning, as part of his daily radio programming. The radio



Station WREO

The two towers are of steel, 250 feet high and set 135 feet apart

engineer in charge of the broadcasting station was Howard C. Graham.

On Tuesday and Thursday evenings from 8:00 to 9:30 P.M., listeners could tune in and hear the WREO musical program featuring the Reo Band and Orchestra, Reo Glee Club and the Reo Male Quartet under the direction of Carl Hall Dewey. A program of dance music was broadcast every Saturday from 9:00 until 12:00 midnight. Church services were broadcast every Sunday morning. Chimes were provided by the Plymouth Congregational Church. The various churches in the central part of Lansing would alternate broadcasting sermons. Sunday evenings, the Central Methodist Church would provide additional program.

"W-R-E-O—Watch Reo" was the cue to a good program in every corner of the continent. Roy Davis showed exceptional skill in arranging the programs and the handling of the station. Band men and musicians in all parts of the country would contact director Dewey, for information on the ideal grouping of instruments to carry so perfectly into radio space.

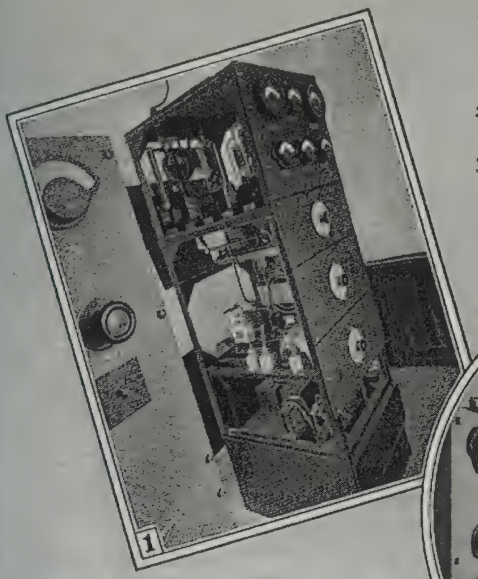
Listeners contacted WREO as well. Postal cards from across the nation, including Hawaii streamed into the station that WREO was being heard in their households. During 1925, a letter was received from J. P. McMurray of Bangor, County Down, Ireland, slightly south of Belfast that he had listened to the broadcast for about 20 minutes, making reference to a basketball game being aired by the station. Still later, a letter was received from New Zealand by a listener, but noting "severe fading at times."

In January of 1925 a second "local" station would begin broadcasting—WKAR on the campus of Michigan Agricultural College (now Michigan State University, still using the WKAR call letters. Ed). Both stations would share the same wave length, and the two stations split time, with WKAR being on the air Monday, Wednesday and Friday evenings.

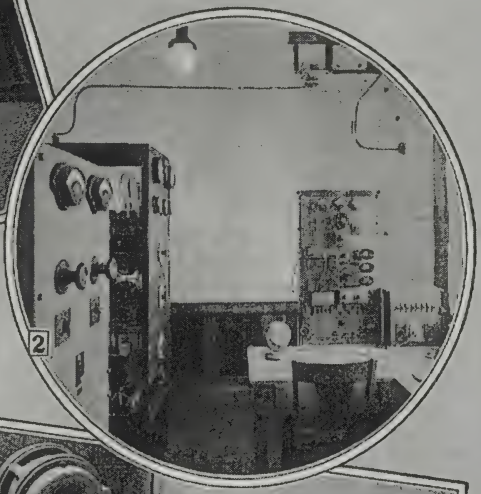
Although short-lived, WREO, served its purpose for the Reo Motor Car Company. From the very beginning the company noted that the "value of the station to the Reo family is untold. Being a member of the Reo family will strike a familiar note with thousands of new friends from the Atlantic coast to the Pacific, from the gulf to the outposts of Hudson Bay."

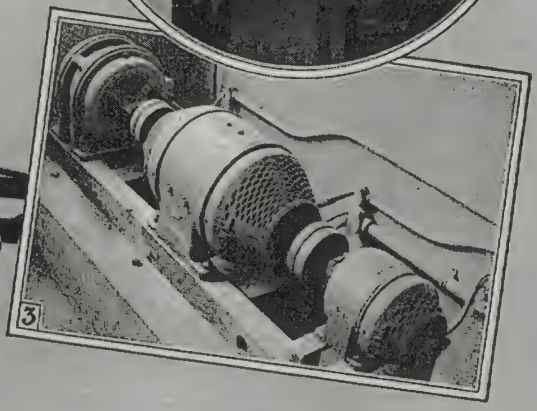
"This is WREO, at Lansing, Michigan, signing off."

This article was originally written by Craig Whitford for the Historical Society of Lansing. It was submitted to us be Dave Pfaff, Historian, R. E. Olds Transportation Museum.



1. *View of transmitting or radio panel showing its interior mechanism and bulbs. This is the middle panel in photograph 2. It is the heart or main unit of the complete outfit*
2. *Complete layout of broadcasting equipment*
3. *Generator and transformer which changes the alternating current into direct current and "steps it up" to the required voltage*





The "mike," as it is known in radio circles is shown at the left. Its complete name is the microphone. It is the "audience" to which the band plays, the orator speaks and the singer sings. "At the other end" of a million ethereal waves, with headsets on or loud speakers connected sit thousands, maybe hundreds of thousands, enjoying the entertainer's efforts. A loud speaker in the operating room takes the sounds from the studio and reproduces them, enabling the operator to set his instruments to best put on the air the sounds he hears.

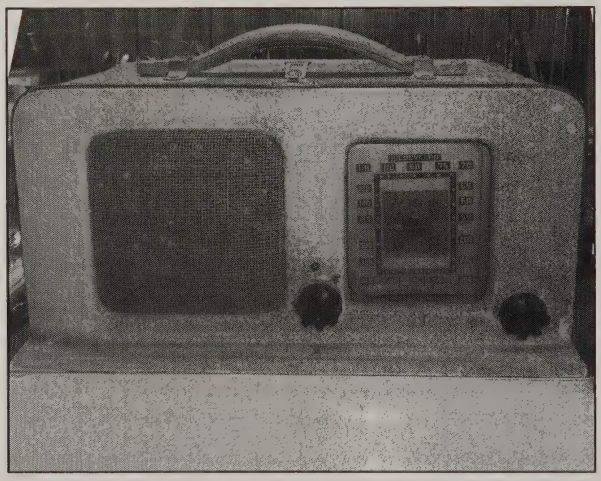
The Detrola 389

By Edward Dupart

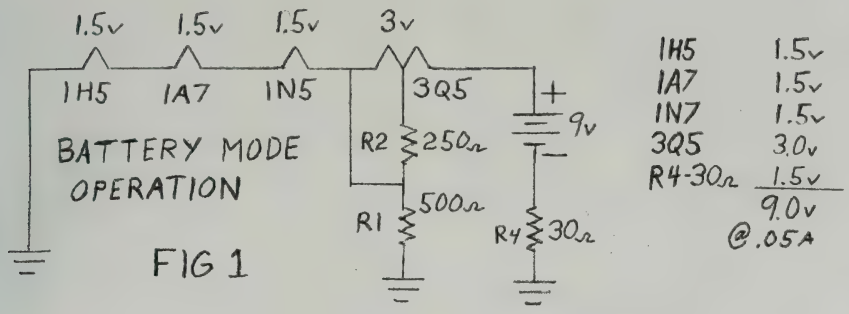
Back in the 1960's people would bring in radios from the 1930's to the 40's to have repaired and I gladly worked on them. After all, old radios were my love. These radios would be 20-30 years old and people liked them for a variety of reasons; it could be grandma gave it to them, maybe they liked the sound or the style of the cabinet and it's not much different today. Let's go back 25 years from this year of 2019 and we would be back in 1994 and we would find people today still using a stereo, TV or a radio from that time period and still want to keep it working. This reminds me of my brother who had a Magnavox TV from the late 1970's that he and his wife loved, but it got outdated. So I took out the old chassis and we went and bought a new LED TV that fit very nicely in the old Magnavox cabinet and they are very happy with it. But back to the 60's when I was seeing some really neat old radios, one I remember repairing was an AC/DC battery Detrola back in Detroit that had an ingenious filament circuit that eliminated the need for a dropping resistor for the battery tube's filaments. I haven't worked on one in years. Then...

A friend of mine sent me a picture of an AC/DC battery Detrola radio and he needed a schematic for it and the model number wasn't in the Rider manuals. So he sent me a tube layout and I gave him a model number to use and he did find the right schematic and it was for a Detrola 389. He was also confused, and so was I, about the filament supply for the battery tubes and the schematic on the computer wasn't very clear, which made matters worse. After all it has been decades since I worked on one of these. He did realize that the cathode of the 50L6 was supplying the voltage to the battery tubes, but how the 3Q5's filament was turned on and off was a bit of a puzzle. Because some of you may run into such a circuit, I decided to redraw the filament circuit and explain how this unusual circuit works. If I recall correctly, I don't believe Detrola was the only one that did this.

One of the things I do when working with a complicated or cluttered circuit is use high lighters and outline the circuit one is interested in studying. In my case I outlined all the filament circuits in pink. Then I can see the circuit I'm interested in and I will redraw it on a separate piece of paper. In figure 1, I redrew the filaments when in the battery mode. Detrola didn't label their parts as R1, C1, etc. but for this discussion I did label the resistors in question. R1 is a 500 ohm resistor and R2 is a 250 ohm resistor and the 250 is not very clear in the schematic. Both of these resistors provide biasing for the 3Q5. 8mA is the approximate plate current and 1mA for the screen grid for the 3Q5 and that will produce a 6.75 volt drop across R1 and R2 and is within range for what the tube manual calls for, which is –4.5 v and –6.6 v. Also notice that the 250ohm resistor is in parallel with one half of the 3Q5 filament. The 3Q5 can be operated with 3 volts at .05 amp or the filament can be put in parallel

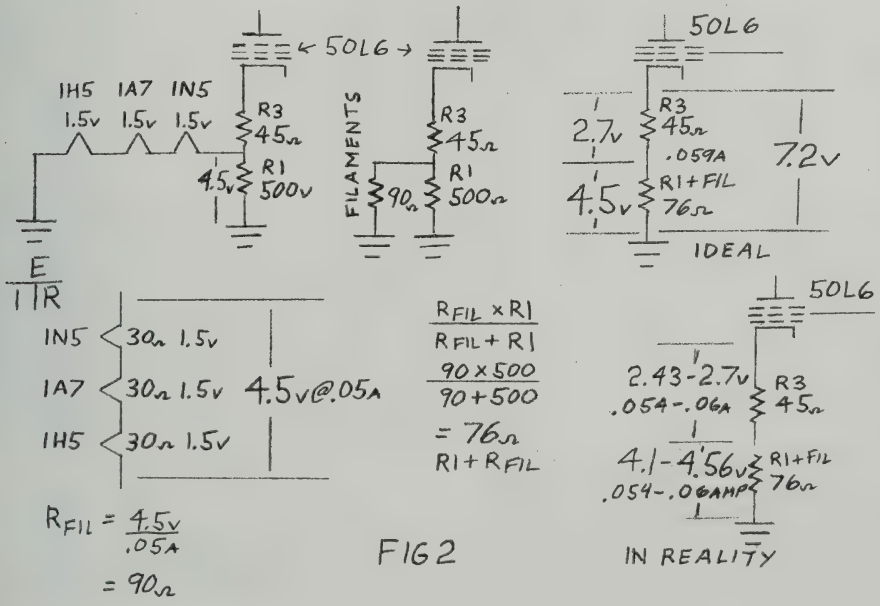


The Detrola 389



and operated at 1.5 volts at .1 amp and gives a little more output power. In this radio they are applying 3 volts to the 3Q5 filament. The DC resistance of the 1.5volt filament is 30 ohms and so the 250 ohm resistor in parallel with the filament will have very little effect on the filament current. Likewise, the 500 ohm resistor will have negligible effect on the filament current. R4, the 30 ohm resistor, which has the same resistance as the 1.5 volt tubes, drops 1.5 volts across it. This allows Detrola to use the more common battery packs with two 45 volt batteries that equals 90 volts and 9 volts. As shown in figure 1, all the filaments and the drop across R4, the 30 ohm resistor all add up to 9 volts. The on/off switch for the A or filament battery is in the negative lead of the battery. The schematic doesn't show it, but the negative lead runs through the AC plug to the switch and then to ground. This part of the circuit is pretty straightforward.

Another confusing part of the 3-way radios is the switching arrangement to go from battery operation to AC operation. Most manufactures show the switch circuitry in detail, but in this Detrola circuit they simplified it. Look at the schematic



at the top prong of the AC plug and that is the switch and it is in battery mode where the negative ends of the battery are hooked together at the prong and the AC plug is plugged into the switch on the chassis. Remove the AC plug from the chassis mounted switch and that opens up the connection of the negative ends of the battery from ground, so now the battery is no longer in the circuit. This is the mode we will study now, the AC mode. Look at the right hand filament terminal of the 3Q5 and it goes directly to the positive terminal of the 9 volt battery. Since the battery is now disconnected, no current will flow through the 3Q5 and so essentially, the 3Q5 is out of the circuit, including R2 the 250 ohm resistor that is in parallel with one half of the 3Q5's filament. Hence, I don't show the 3Q5's filament in figure 2. It would be excess clutter.

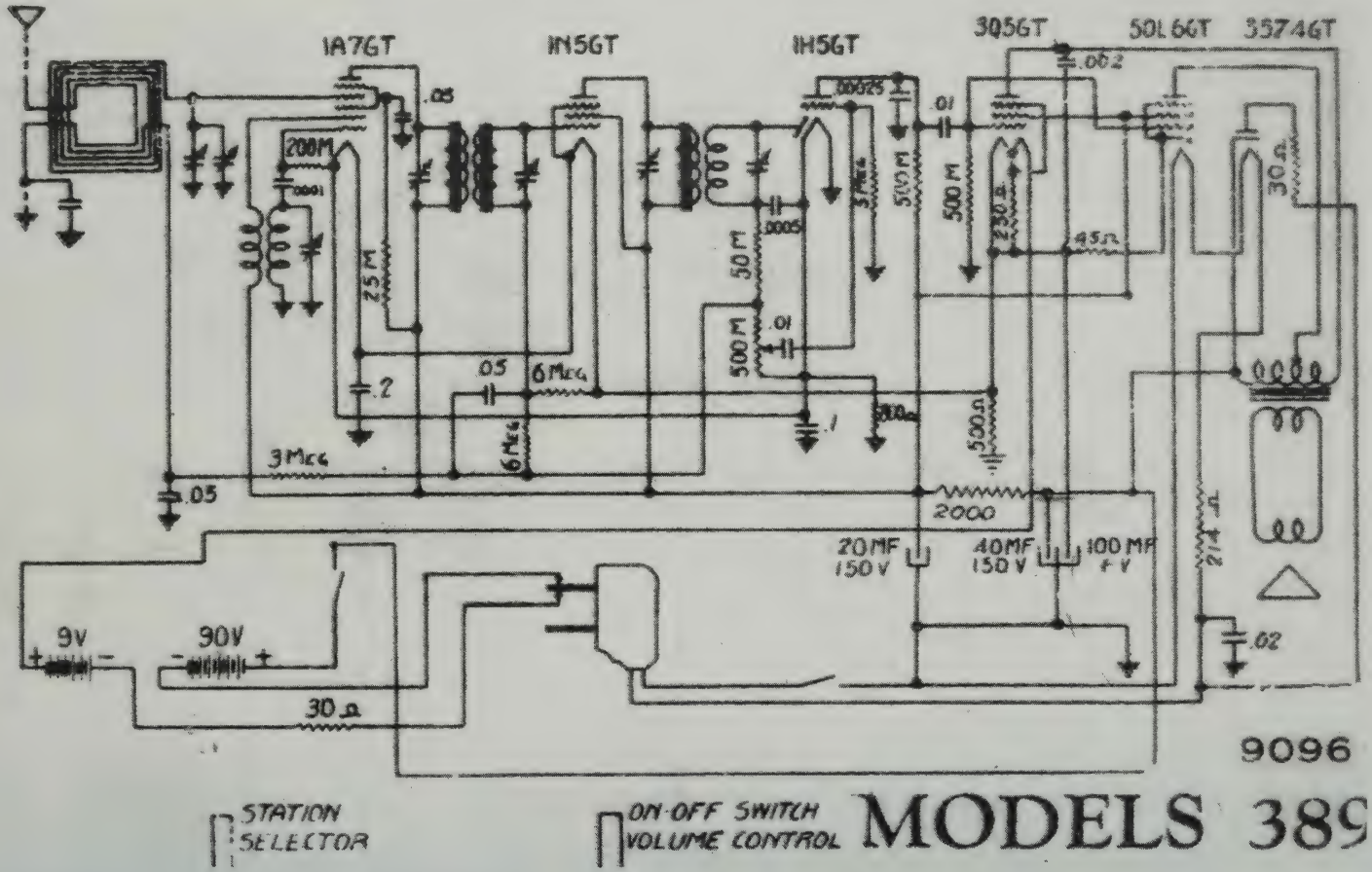
The three tubes, 1N5, 1H5 and the 1A7 are shown in series and the combination is in parallel with R1 the 500ohm resistor. The DC resistance of each of the tubes is 30 ohms for a total of 90 ohms that is in parallel with the 500 ohm resistor and the voltage across the three tubes should be 4.5volts. This will also force 4.5volts across R1 the 500 ohm resistor. The combination of the filaments 90ohm resistance across the 500ohm resistor will give us 76ohms and with 4.5 volts will give us .059 amp. Current stays the same in a series circuit so that means .059 amp is flowing through the 45 ohm resistor to give us a 2.7 volt drop across it. Add the 4.5 volts to the 2.7 volts and we now have 7.2volts. The RCA tube manual has a suggested 7.5 volts for the cathode resistor, which will produce a negative 7.5 volts bias for the 50L6. 7.2 volts are pretty close to the suggested 7.5 volts.

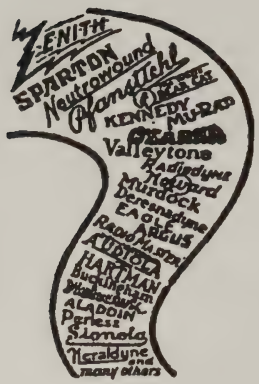
In reality, the 50L6 with no signal draws about .049 amp of plate current and .004 amp of screen grid current for a total of .054 amp. This would produce a voltage drop across the 500-ohm resistor of about 4.1 volts and that divided by 3 would give about 1.37 volts per filament. At maximum signal the plate draws about .05 amp and the screen grid draws about .01 amp for a total cathode current of .06 amps. This would produce a voltage drop of 4.56 volts and that divided by 3 would give about 1.52 volts per filament. So the voltage variation would range from 4.1 to 4.56 volts or 1.37 to 1.52 volts per filament, which would be acceptable. My experience with experimenting with battery tubes is that this variation would not produce a noticeable change in performance with good tubes. Using the 50L6's cathode resistor as the filament-dropping resistor gets rid of another hot running component. Pretty clever!

To reduce clutter in the drawings I didn't show the 100 mfd filament filter capacitor, but it is in parallel with the 500 ohm resistor. Besides filtering the pulsating DC to eliminate hum, it also increases the gain of the 50L6 and the 3Q5 slightly.

At first glance at the schematic some might think it is a push-pull circuit with the taps in the primary of the audio output transformer. The taps are there to match the two different impedances of the two very different audio output tubes. 2,000 ohms load resistance for the 50L6 and 8,000 ohms load resistance for the 3Q5 and notice the 50L6's plate connects farther down the winding for less resistance.

Besides eliminating the filament-dropping resistor, why go to all this bother with two audio output tubes? In battery mode the 3Q5 can put out about 230 mw or .23 watt, which is fairly loud in a small room, but in the AC mode the 50L6 can put out about 2 watts, almost ten times the power! So in the AC mode you could annoy your neighbor with this radio.


1A7GT
1N5GT
1H5GT
3Q5GT
50L6GT
35Z4GT
.05
200M
.0001
25M
.2
.05
6Meg
3Meg
6Meg
.05
.0025
.01
3Meg
500M
500M
.0005
50M
500M
.01
.1
500Ω
500Ω
2000
.002
500M
230Ω
45Ω
30Ω
214Ω
.02
20MF
150V
40MF
150V
100MF
+V
9V
90V
30Ω
9096
STATION
SELECTOR
ON-OFF SWITCH
VOLUME CONTROL
MODELS 389



The Classified Ads

As a MARC member, you are entitled to one FREE posting per issue. Please e-mail your ad to the address below, or snail-mail a legibly written ad to: Steve Enzer, Editor, MARC Chronicle, 12740 Monroe Pike, Brooklyn, MI 49230. E-mail: enzer@binsys.com.

Please note that ads for the Spring issue are due by March 1st.

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FINDER'S FEE: I am willing to pay a $100 finder's fee to the first person who can provide me the whereabouts of the Reuben Smith 5-tube TRF battery radio with a glass front panel (circa 1925) manufactured in Lansing, MI that I traded off to the late Oran Sauder of South Lyon, MI perhaps 25 or more years ago. Jim Clark, 517-648-2785 or jc072651@aol.com. Thank you.

WANTED TO BUY: Your old capacitors, new or used (prefer with leads). All types: Wax, plastic, molded, striped, metal shell, disc, etc. These can be from your radio restorations, junk box, or vintage 1940-70s new old stock. Will pay shipping as well, or I can pick up in Kalamazoo at Expo 2017. Dan Gutowski 734-718-7450 email: dg16ms26@msn.com.

Perspectives, continued from page 3)

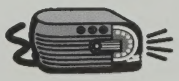
There will be on-site food and bar service. The hall can host the President's Reception on-site. We will have more details on features and amenities in the months to come.

You may notice that the show is the 18th and 19th of July, which is a Saturday and Sunday. We are still negotiating a Friday night load-in. We are moving the start hours a bit later to accommodate morning load-ins on Saturday. Switching to Saturday-Sunday for the main show days will, we believe, greatly boost attendance among the younger generation, critical not only for the money they will spend at the show but for the long-term sustainability of the hobby.

As always, any concerns and suggestions, pro or con, can be directed at me. My contact info is available right in front of this issue. You can also send us a message via the website.

Here's hoping you all have a pleasant and restful holiday season. I look forward to seeing you all at the Winter VEE, and we will continue to keep you all abreast of the latest developments in the new-look Extravaganza!

Jeff



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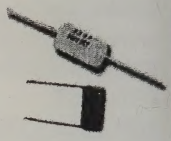

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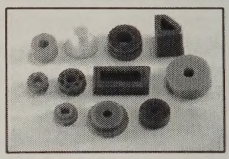

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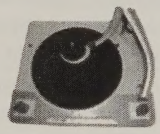

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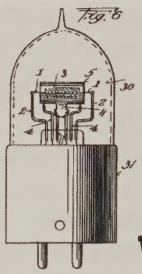


JIMCO Tubes Pty Ltd.
Mike Dale
3464 Judd Rd.
Milan, MI 48160
MDALE8@PeoplePC.com
(734) 439-0834

We Buy and Sell Tubes!

Call for Articles

Your editor is always looking for new articles. Many of our readers have indicated a preference for articles related to collecting, as opposed to highly technical pieces. Of particular interest are personal accounts of a particular restoration you might have done, or historical accounts related to our hobby. But all subjects related to vintage electronics are welcome.

If you have an idea please feel free to discuss it with me, either by phone or email.

Steve Enzer, MARC Chronicle Editor, enzer@binsys.com. 517-592-2841

Paid Ads Accepted

The *Chronicle* accepts paid **business card sized ads**. The ad may be in the form of your business card, or other text/graphics of business-card size. All submissions must be camera-ready. We will not do any typesetting, but simply copy what you send us. Also, your ad can appear on the MARC website at no extra charge.

Rates: $10 per single issue, $35 per year (four issues).

Please send all submissions to:
Steve Enzer, MARC Chronicle Editor,
12740 Monroe Pike, Brooklyn, MI 49230
Enclose a check for correct amount payable to MARC.

Winter Meet February 1st in Farmington Hills

Vintage Electronics Expo Powered by MARC

Date: Saturday, February 1, 2020.

Location: Costick Activities Center, 28600 Eleven Mile Road, Farmington Hills, Michigan. Entry is at Gate 4, Door A.

Time: Setup starts at 7:30 AM for sellers. Also, Early Bird admission for buyers is at 8:00 AM. General admission is from 9 AM to 3 PM.

Admission Fees: $5.00 for general admission, $10 for Early Bird admission.

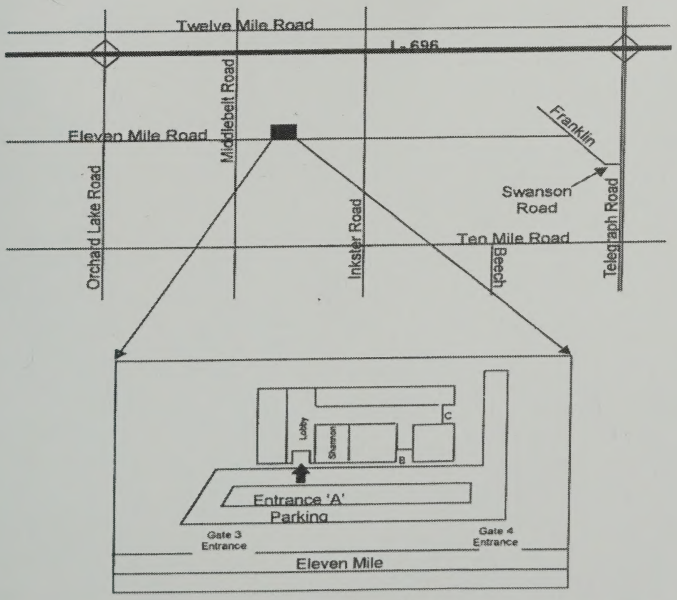
Activities: Flea Market, Equipment Contest, 50/50 Drawing, Seller's Drawing, Silent Auction, and Donation Auction, and special presentations.

Contest Categories:

All collectors have items that are special to them. We encourage you to show them off at our meets, and this the contest is the place.

- **Dumpster/Curbside:** Bring that radio or stereo you picked up for free.
- **Customized "Hot Rod/Rat Rod":** Show off any vintage item you customized.
- **The Open:** Any vintage electronic item including radios, televisions, test equipment, calculators, and games.

Hosts: Mike Dale and Rob Murrell. Please send table registration forms and fees to Rob at 2420 Princeton, Berkley, MI 48072 . Direct any questions regarding the meet to Mike at 734-439-0834. For general club information call Mark Oppat at 734-455-4169.



Back again for audio enthusiasts:

The Winter VEE Amplifier/Tuner Clinic

Jeff Hall of Muse Audio in Ann Arbor will again be offering an amplifier and tuner clinic at the Winter Vintage Electronics Expo Saturday, February 1 at the Costick Center.

Jeff is an expert on stereo and mono audio gear and will have sophisticated test equipment on hand to check for distortion, power output and noise level as well as tuner sensitivity and other parameters. This is for either tube or transistor equipment and a print out of performance will be issued at the end of each unit tested. This service will run $20 per unit and will be split between the club and Jeff. This kind of test is hard to find today and would cost well over $50 at most any repair shop that could even do it today. Bring your audio gear and see how its performing!